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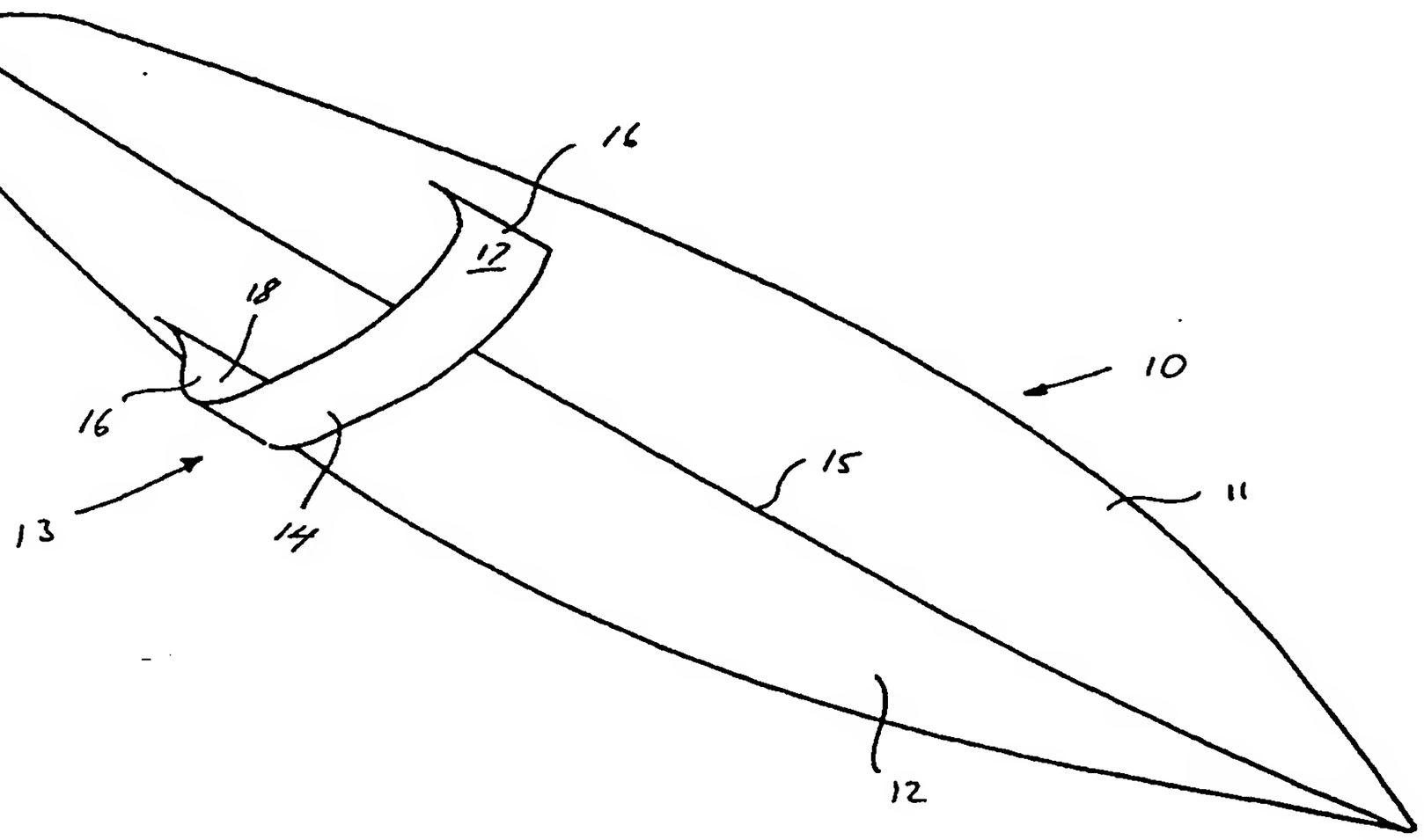

(57) Abstract

This invention relates to a water–borne craft (10) which includes a body portion (11) constructed from a blank of foamed material. The underside (12) of the craft (10) includes a depending fin like member (13) having an intermediate portion (14) which is spaced from the underside (12) of the craft (10) and which is arranged to extend transversely across a fore–aft axis (15) of said craft (10).

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WATER-BORNE CRAFT

This invention relates to water-borne craft.

This invention has particular but not exclusive application to a surf board, and for illustrative purposes reference will be made to such application. However the invention may also be applied to other water-borne craft including surf skis, sailboards, boogie boards, kayaks, canoes and water skis.

Surf craft require a high degree of manoeuvrability to enable the surfer to perform on the face of the wave while maintaining proper momentum down the face of the wave. This normally requires a number of sharp turns.

Turns are typically achieved by the surfer redistributing his weight and/or applying pressure to selected portions of the board in order that he or she may alter the angle of inclination of the board relative to the surface of the water.

In order to improve the stability and manoeuvrability of the surfboard, the underside of the surfboard may include one or more depending fins which are preferably located at or near the trailing portion of the board.

However, while manoeuvering the surfboard, some or all of the fins, or significant portions thereof may be removed from the water thereby reducing the stability and/or manoeuvrability of the surfboard.

It is also noted that the surfer's ability to maintain his or her balance is often dependent upon the speed of the

board and wherein surfers generally find it difficult to maintain their balance as the speed of the board slows down, such as when performing a turn and following the execution of the turn.

The present invention aims to alleviate at least one of the above disadvantages and to provide a water-borne craft which will be reliable and efficient in use. Other objects and advantages of this invention will hereinafter become apparent.

With the foregoing and other objects in view, this invention in one aspect resides broadly in a water-borne craft which may be manoeuvred across a surface of a body of water, said water-borne craft including:

a body portion having an underside which is at least partially immersed beneath the surface of the water during operative use, and

a fin like member having an intermediate portion which is spaced from the underside of said body portion and which is arranged to extend transversely across a fore-aft axis of said water-borne craft.

In one embodiment, the intermediate portion of the fin may lie in a plane which is substantially parallel to a plane containing the underside of the body portion. However, in other embodiments the intermediate portion of the fin may be arcuate or may include two upwardly and outwardly divergent portions, or may have a trailing portion which diverges

toward the underside of the board and wherein there is created a constriction through which the water flowing over the underside of the board must pass through.

The intermediate portion of the fin preferably includes an inner surface which faces the underside of the body portion and an outer or opposing surface.

In some embodiments the intermediate portion may have a symmetrical profile. For example, both the inner surface and the outer surface may be substantially flat or outwardly curved.

In other embodiments, the intermediate portion may have an asymmetrical profile. For example, the inner or outer surface may be outwardly curved while the other surface may be substantially straight or inwardly curved.

The transverse portion may be suspended between and supported by two opposing fin-like supports depending from the underside of the body portion. In one embodiment the intermediate portion may be formed integrally with the fin-like supports. Alternatively the intermediate portion may be attached to the fin-like supports and wherein in one embodiment the intermediate portion may be adapted for selective attachment thereto.

The fin-like supports may have an asymmetrical profile. For example, the fin-like supports may include an outer surface which is outwardly curved and an inner surface which is substantially flat.

Furthermore, the fin like supports may include a rearwardly inclined or sloping leading edge and wherein as a consequence the intermediate portion may trail behind the leading edge of the fin like supports.

The fin-like supports may also constitute a fence which in use may prevent water flowing along the intermediate portion in a direction generally transverse to the fore-aft axis of the body portion and wherein each fin-like portion may include free end portion which extends beyond the outer surface of the intermediate portion.

The intermediate portion may also provide a base for the attachment thereto of one or more depending fins.

The intermediate portion may also include an extension or trailing portion which trails behind the fin-like supports and which may include an unsupported free end portion.

The intermediate portion may be constructed from a flexible material and wherein when effecting a turn selected portions of the intermediate portion may be resiliently deformed. For example, due to a general easing of the forces applied to the intermediate portion as may result from the completion of the turn, the intermediate portion may be permitted to return to its pre-deformed shape and wherein the resulting release of energy may help propel the body portion through the water at a greater speed.

In addition, the trailing portion may be resiliently connected to the intermediate portion and may pivot about an

axis coincident with said connection. For example, the consequent fluttering action of the trailing portion may be used to help propel the body portion through the water.

In order that this invention may be more easily understood and put into practical effect, reference will now be made to the accompanying drawings which illustrate a preferred embodiment of the invention, wherein:-

FIG. 1 shows an underside view of a water-borne craft according to a first embodiment of the present invention;

FIG. 2 shows an underside view of a water-borne craft according to a second embodiment of the present invention;

FIG. 3 shows a side elevation of the craft illustrated in figure 2;

FIG. 4 shows an underside perspective view of the craft illustrated in figure 2;

FIG. 5 shows an end elevation of the craft illustrated in figure 2;

FIG. 6 shows a perspective view from above and to one side of the craft illustrated in figure 2;

FIG. 7 shows an underside perspective view of a water-borne craft according to a third embodiment of the present invention;

FIG. 8 shows an enlarged perspective view from above and to one side of the fin arrangement of figure 7, and

FIG. 9 shows an enlarged perspective view from above and to one side of the fin arrangement per se of figure 8.

Figure 1 shows a surfboard 10 which includes a body portion 11 constructed from a blank of foamed material. The underside 12 of the surfboard 10 includes a depending fin like member 13 having an intermediate portion 14 which is spaced from the underside 12 of the board and which is arranged to extend transversely across a fore-aft axis 15 of said board.

The intermediate portion 14 is supported by two opposing fin-like supports 16 which depend from the underside 12 of the board 10. The fin like supports 16 are integrally connected to the intermediate portion 14 and each include an asymmetrical profile, namely an outwardly curved outer surface 17 and a substantially flat inner surface 18.

The intermediate portion 14 is contained in a plane which lies substantially parallel to the underside of the board.

Preferably the intermediate portion 14 is able to flex relative to the fin-like supports 16. For example the intermediate portion 14 and the fin-like supports 16 may be constructed from a resilient plastics material.

It is believed when effecting a turn the intermediate portion may be resiliently deformed, namely that it's mid portion is flexibly urged toward the underside of the board. Further, due to a general easing of the forces applied to the

intermediate portion as may result from the completion of the turn, it is believed that the intermediate portion is permitted to return to its pre-deformed shape and wherein the resulting release of energy assists in propelling the board through the water at a greater speed.

Figures 2 to 6 illustrate an alternative surfboard 30 which includes a body portion 31 constructed from a blank of foamed material. The underside 32 of the surfboard 30 includes a depending fin like member 33 having an intermediate portion 34 which is spaced from the underside 32 of the board and which is arranged to extend transversely across a fore-aft axis 35 of said board.

The intermediate portion 34 is supported by two opposing fin-like supports 36 which depend from the underside 32 of the board 30. The fin like supports 36 are integrally connected to the intermediate portion 34 and each include an asymmetrical profile, namely an outwardly curved outer surface 37 and a substantially flat inner surface 38.

The intermediate portion 34 includes an integrally connected trailing portion 39 from which there depends a fin 40 which has an axis of symmetry coplanar with the fore-aft axis 35. The trailing portion is resiliently connected to the intermediate portion and may pivot about an axis coincident with said connection whereby the trailing portion in use may exhibit a fluttering action which may assist in propelling the board 30 through the water.

The intermediate portion 34 and the trailing portion 39 lie generally in a plane which is substantially parallel to a plane containing the underside of the board.

Figures 7 to 9 illustrate an alternative surfboard 50 which includes a body portion 51 constructed from a blank of foamed material. The underside 52 of the surfboard 50 includes a depending fin like member 53 having an intermediate portion 54 which is spaced from the underside 52 of the board and which is arranged to extend transversely across a fore-aft axis 55 of said board.

The intermediate portion 54 is supported by two opposing fin-like supports 56 which depend from the underside 52 of the board 50. The fin-like supports 56 are integrally connected to the intermediate portion 54 and each include an asymmetrical profile, namely an outwardly curved outer surface 57 and a substantially flat inner surface 58.

The intermediate portion 54 includes an integrally connected trailing portion 59 which includes a slotted aperture 60 which has an axis of symmetry coplanar with the fore-aft axis 55. The trailing portion is resiliently connected to the intermediate portion and may pivot about an axis coincident with said connection whereby the trailing portion in use may exhibit a fluttering action which may assist in propelling the board 50 through the water.

The intermediate portion 54 and the trailing portion 59 lie generally in a plane which is substantially parallel to a

plane containing the underside of the board.

The board 50 also includes a depending fin 61 which lies along the fore-aft axis 55 and includes a free end portion 62 which extends through said aperture 60.

The trailing portion 59 surrounding the fin 61 and the aft portion of the board 50 may act as fences and in use may prevent or inhibit the flow of water along the fin 61 in a direction generally perpendicular to the underside of the board.

It will also be appreciated that the two fin-like supports may also act like fences and may inhibit the flow of water along the underside of the intermediate portion 54 in a direction generally transverse to the fore-aft axis of the board.

It will also be appreciated that while executing turns and such like generally at least a portion of the intermediate portion of the fin-like member is retained beneath the surface of the water and contributes to the improved stability and maneuverability of the craft. It will be appreciated that the fin-like member may be produced separately and attached to the craft using any suitable means of attachment.

It will of course be realised that the above has been given only by way of illustrative example of the present invention and that all such modifications and variations thereto as would be apparent to persons skilled in the art

are deemed to fall within the broad scope and ambit of this invention as is herein defined in the appended claims.

THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:-

1. A water-borne craft which may be manoeuvred across a surface of a body of water, said water-borne craft including:

a body portion having an underside which is at least partially immersed beneath the surface of the water during operative use, and

a fin like member having an intermediate portion which is spaced from the underside of said body portion and which is arranged to extend transversely across a fore-aft axis of said water-borne craft.

2. A water-borne craft as claimed in claim 2, wherein said intermediate portion is substantially fin like.

3. A water-borne craft as claimed in any one of the preceding claims, wherein said intermediate portion is supported by two opposing fin-like supports.

4. A water-borne craft as claimed in Claim 3, wherein said intermediate portion can flex relative to said fin-like supports.

5. A water-borne craft as claimed in any one of the preceding claims, wherein said intermediate portion is generally contained in a plane which is substantially

parallel to said underside of said body portion.

6. A water-borne craft as claimed in any one of the preceding claims wherein said intermediate portion includes a rearwardly directed extension.

7. A water-borne craft as claimed in Claim 6, wherein said extension is capable of flexible movement relative to said intermediate portion.

8. A water-borne craft as claimed in Claim 6 or Claim 7, wherein said extension includes a depending fin.

9. A water-borne craft as claimed in Claim 6 or Claim 7, wherein said extension includes a slotted aperture through which a fin attached to said underside of said body portion extends.

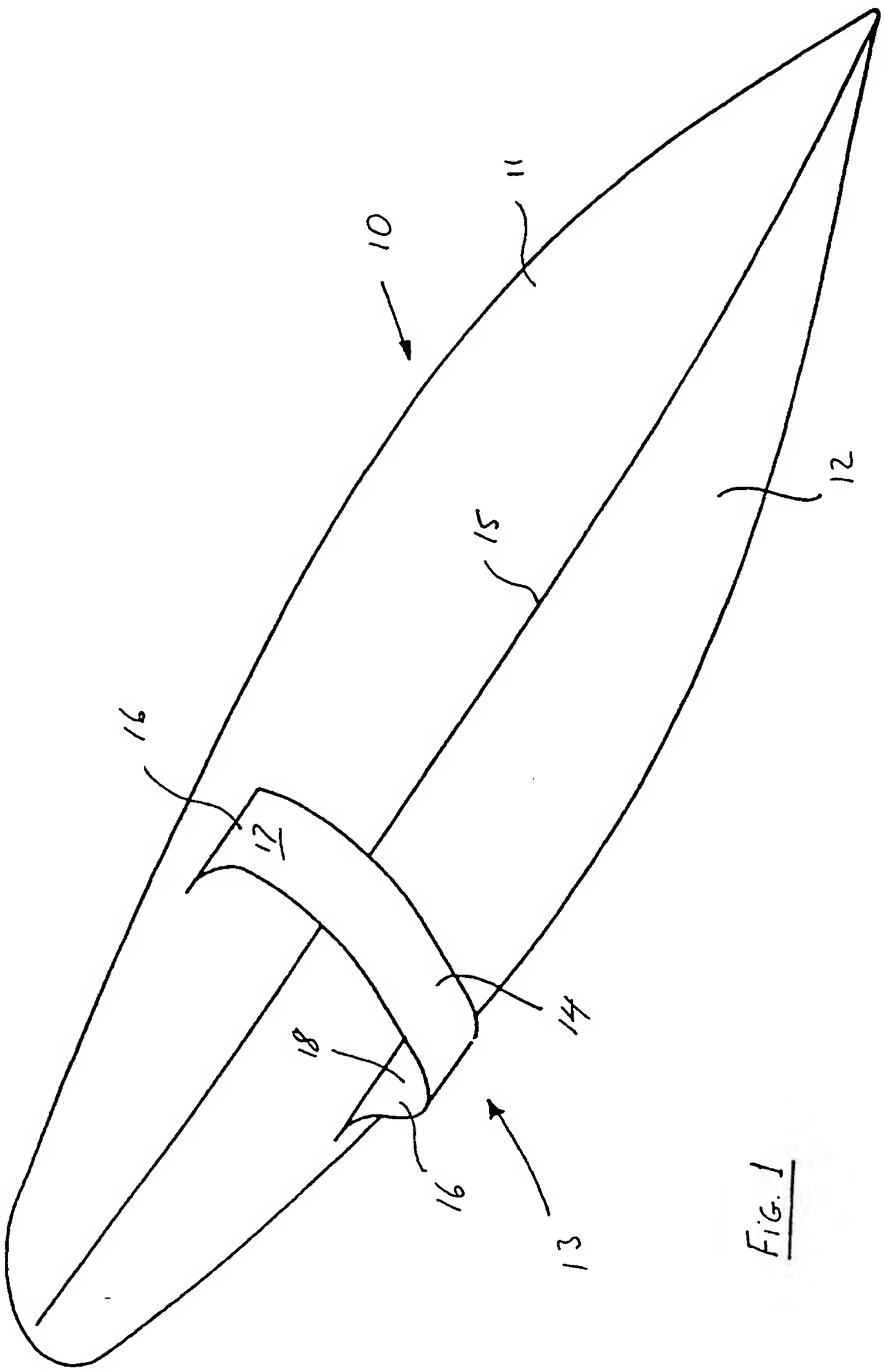

Fig. 1

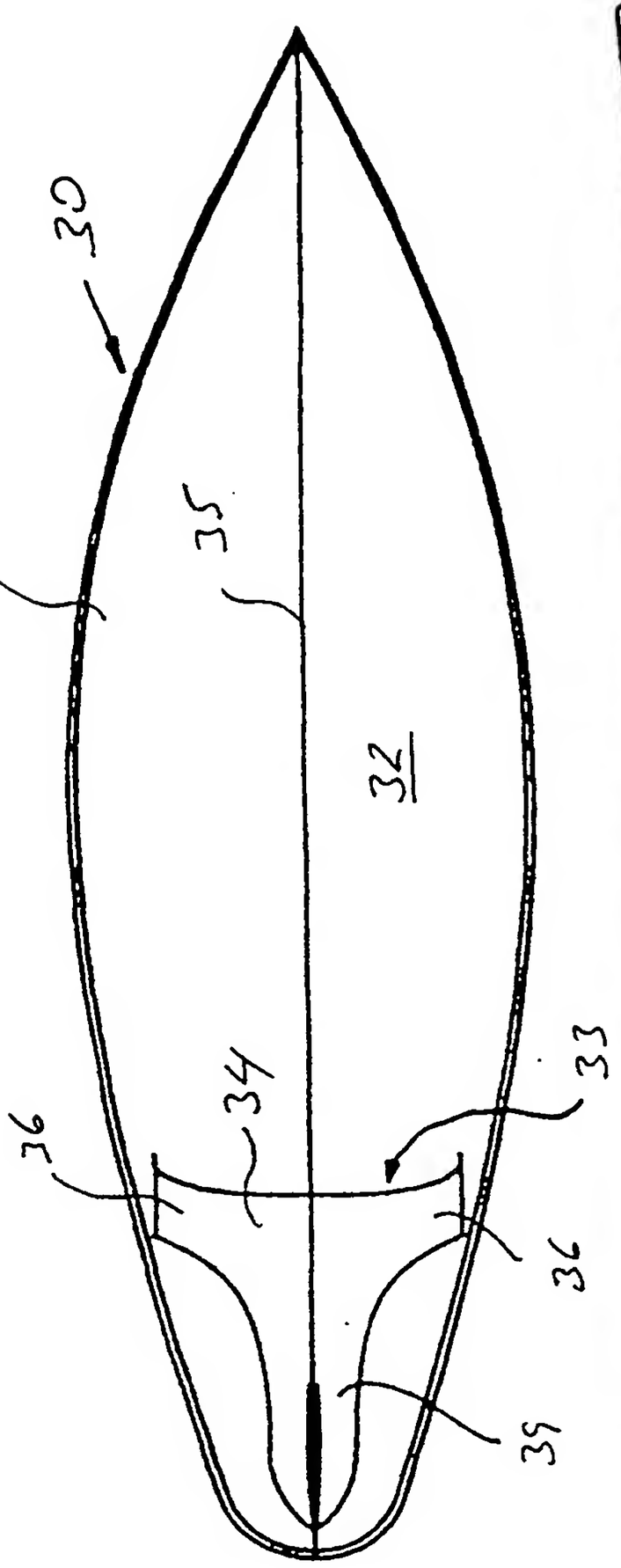

Fig. 2

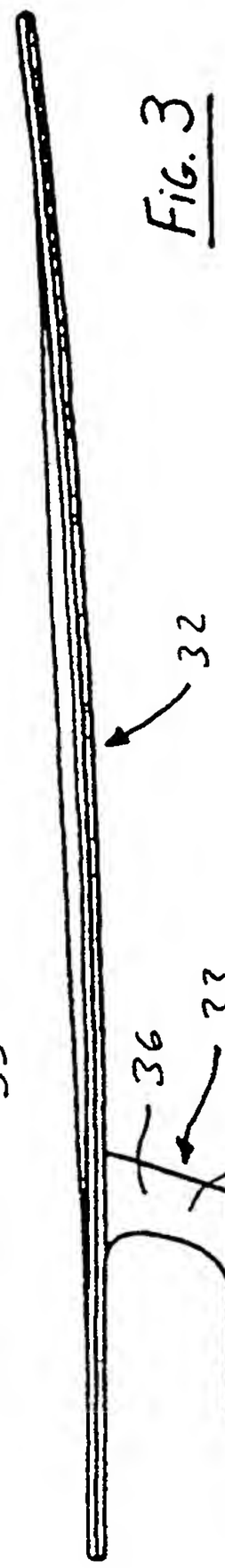

Fig. 3

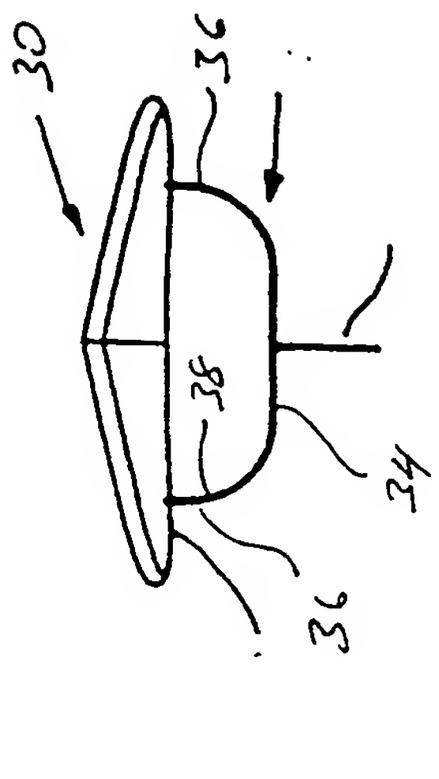

Fig. 5

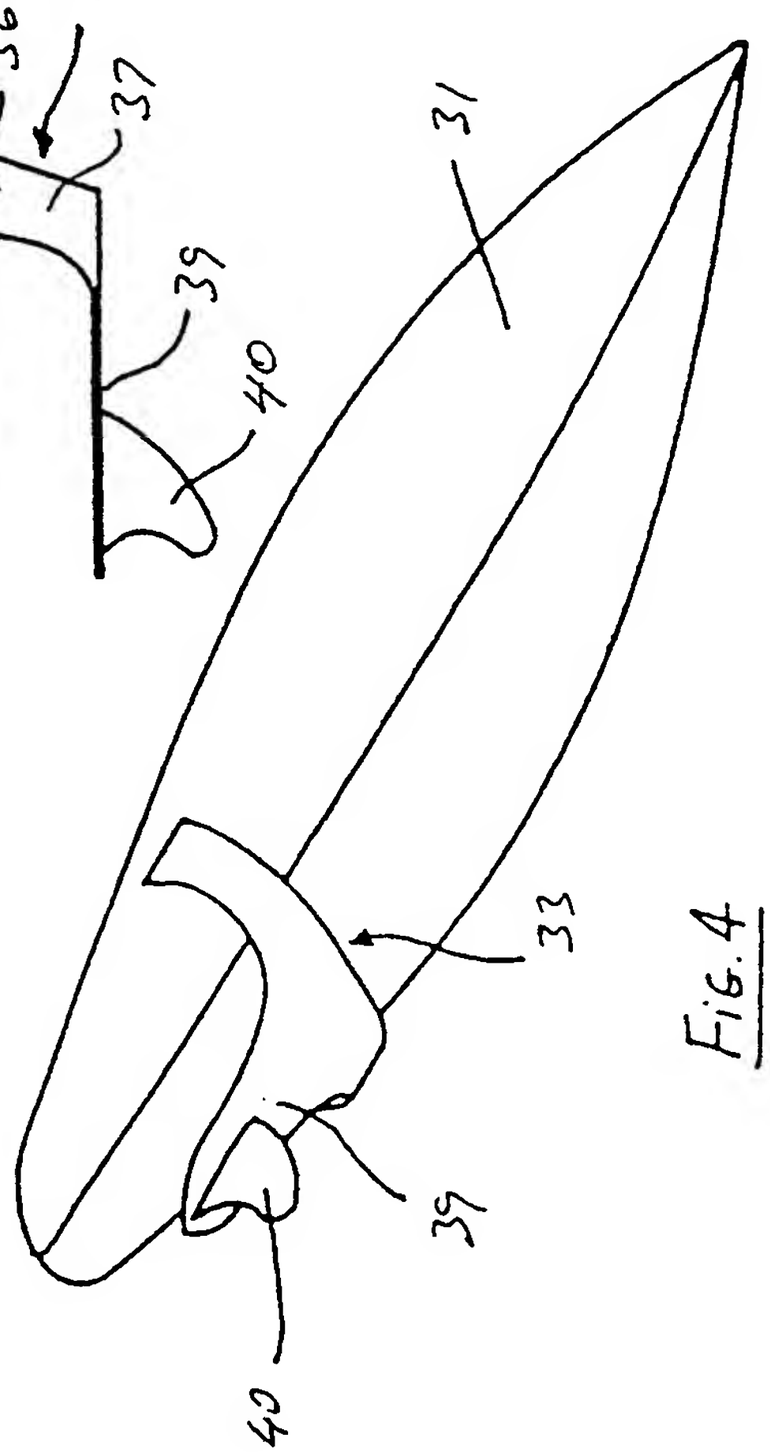

Fig. 4

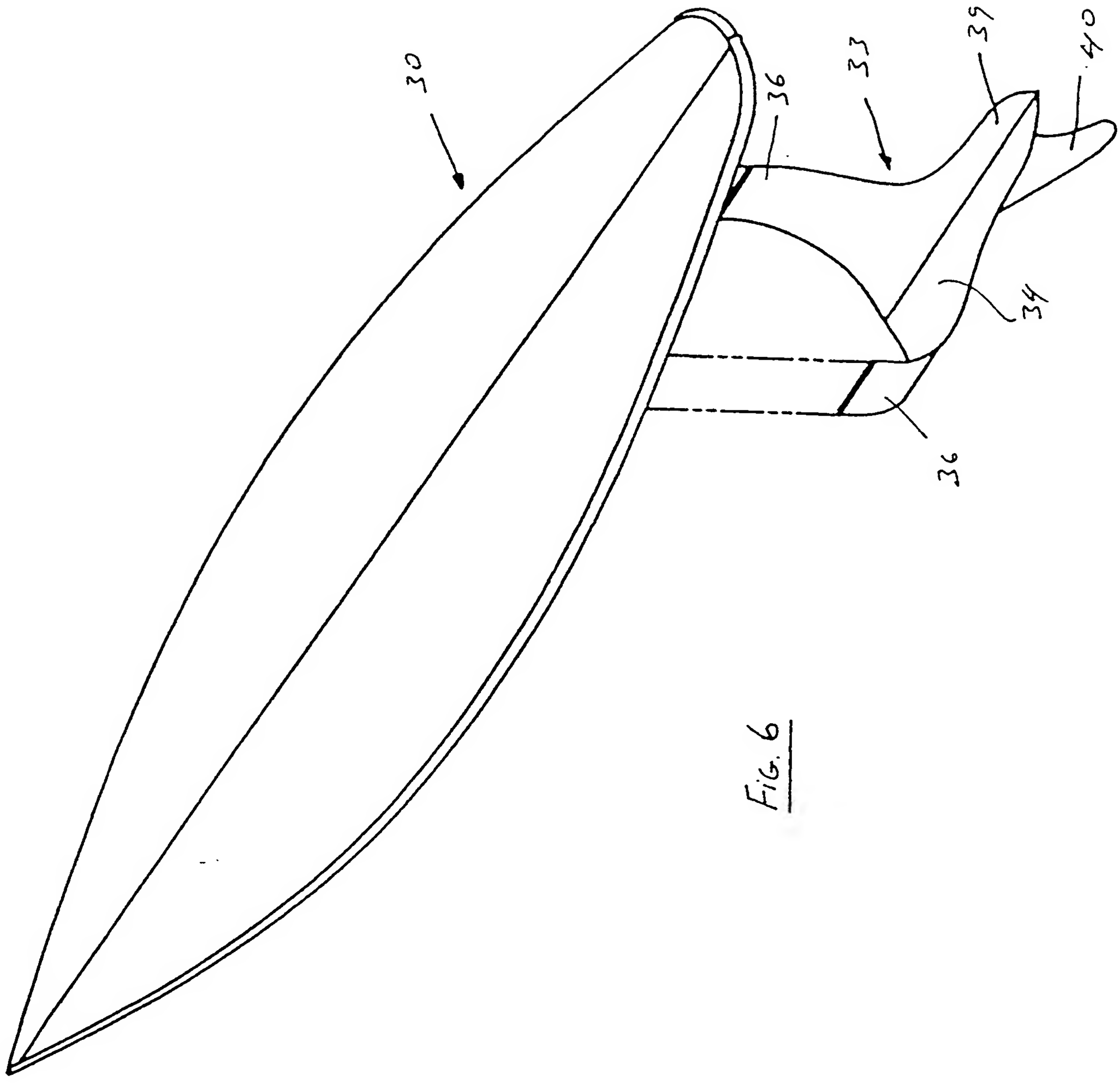

Fig. 6

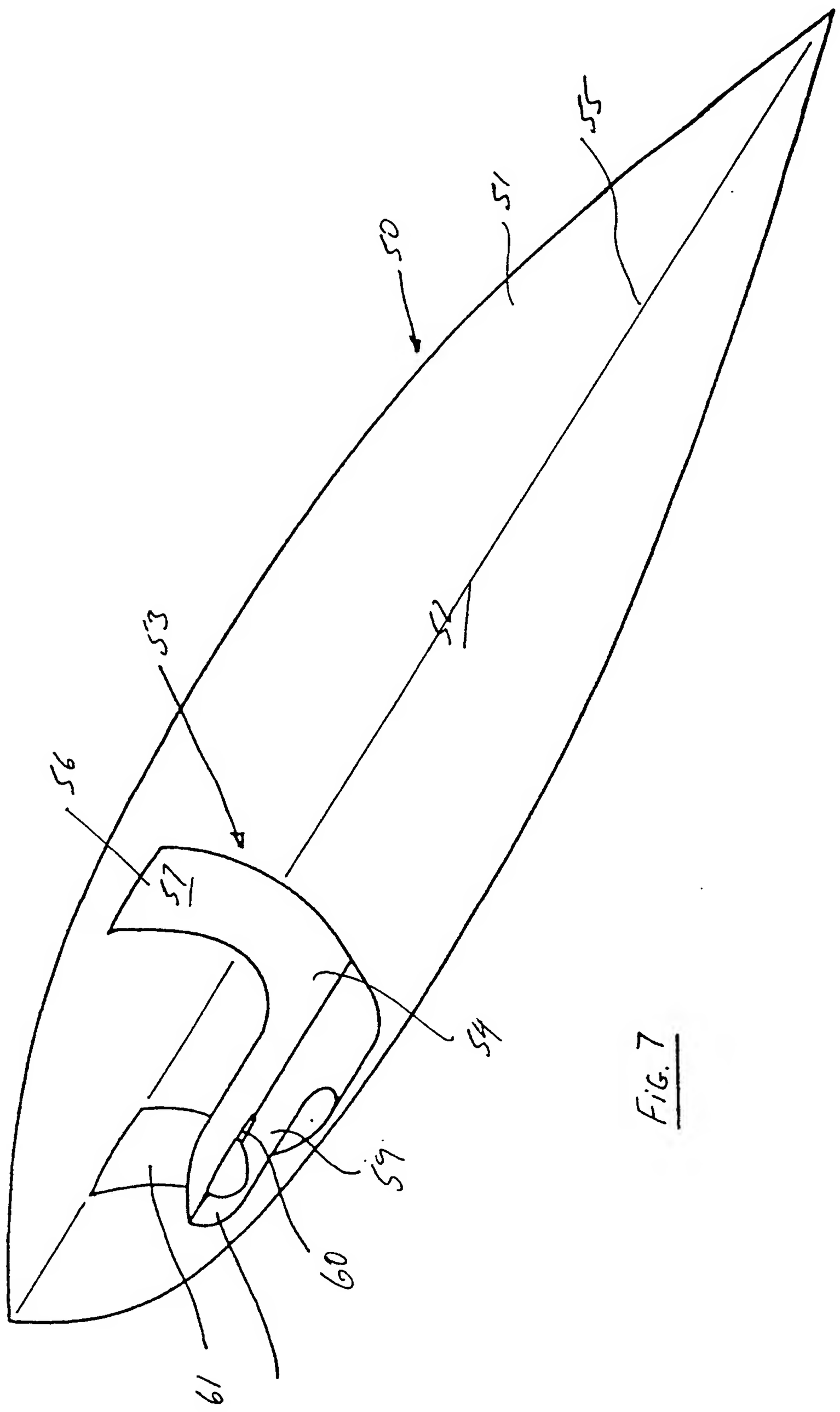

FIG. 7

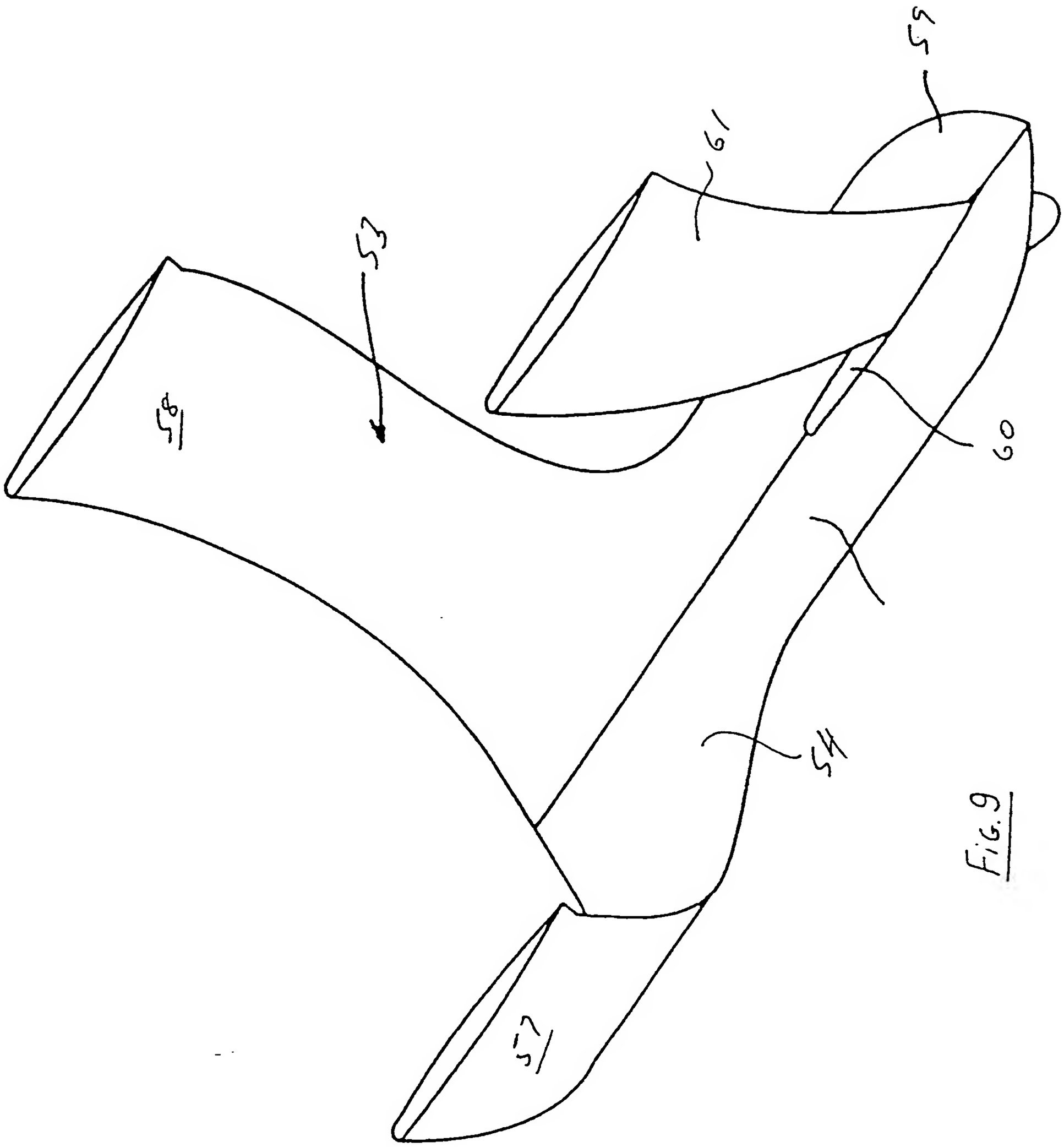

Fig.9

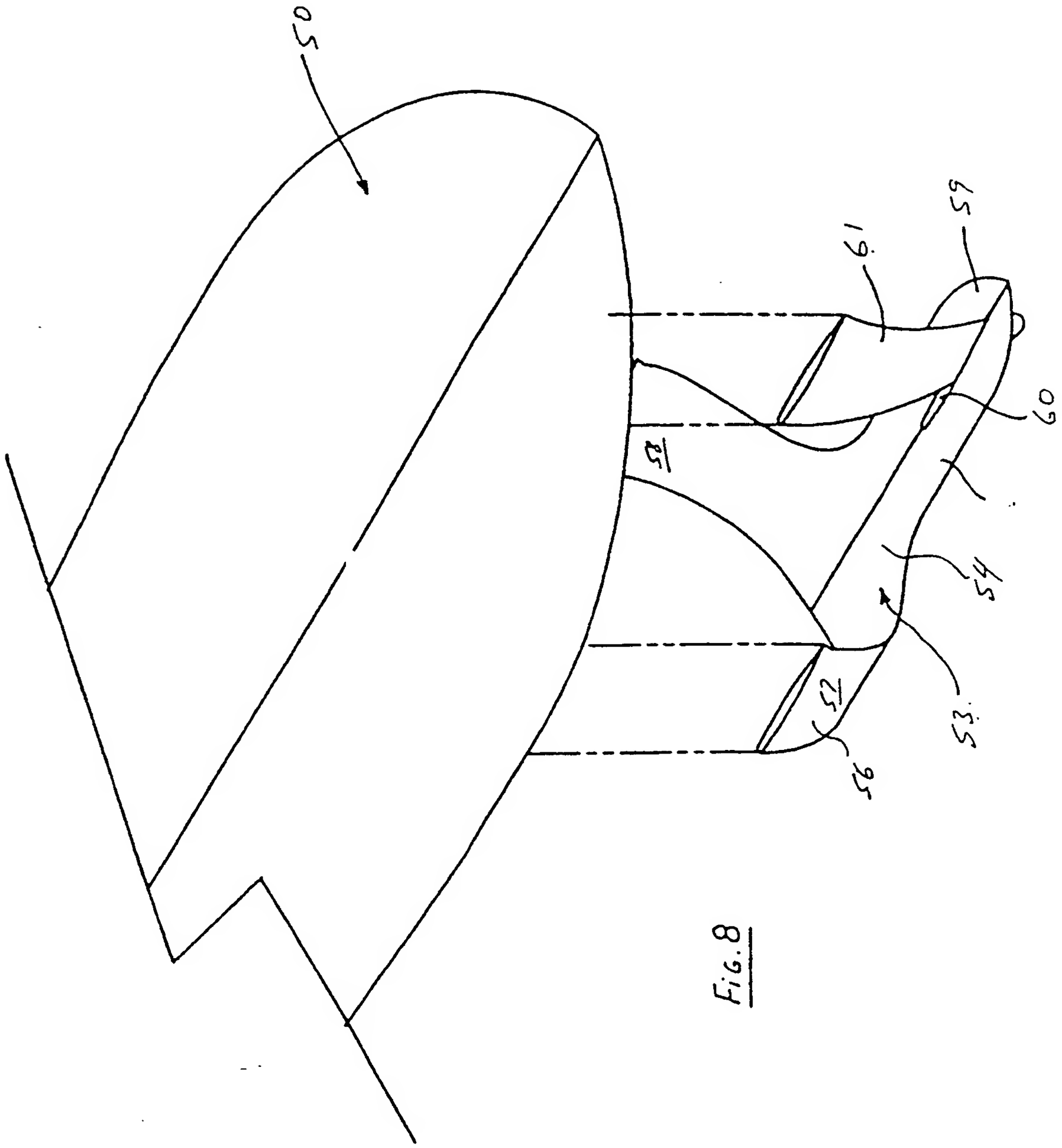

Fig. 8

INTERNATIONAL SEARCH REPORT

International application No.
PCT/AU 98/00915

A. CLASSIFICATION OF SUBJECT MATTER

Int Cl[6]: B63B 35/79

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC B63B 35/79

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
AU: IPC as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
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C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	DE 2922860 A (RUPPRECHT) 18 December 1980 Figures 2 and 4	1-5
X	US 3121890 A (RUMSEY) 25 February 1964 Figure 7	1-5
X	AU 31663/71 A (RICHARD DESIGNS PTY LTD) 1 February 1973 Figures D, E, F, G, H and J.	1-5

[X] Further documents are listed in the continuation of Box C

[X] See patent family annex

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8 February 1999	23 FEB 1999
Name and mailing address of the ISA/AU AUSTRALIAN PATENT OFFICE PO BOX 200 WODEN ACT 2606 AUSTRALIA Facsimile No.: (02) 6285 3929	Authorized officer **S.J. DESCHANEL** Telephone No.: (02) 6283 2368

INTERNATIONAL SEARCH REPORT

International application No.
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C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT		
Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	AU 29821/92 A (KVAERNER FJELLSTRAND AS) 10 June 1993 Page 8, lines 1-2 and 9-12; Figure 3	1-3, 5-8
X	AU 84768/91 A (SAMPSON) 2 April 1992 page 4, lines 22-25; page 6, lines 6-8, Figures 1-5	1-8
X	DE 3231875 A1 (STOLL) 1 March 1984 Figure 1 and 3	1-5

INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.
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Patent Document Cited in Search Report		Patent Family Member					
AU	29821/92	CN	1072894	EP	545878	JP	5238470
		NO	914789	ZA	9209389		

END OF ANNEX

INTERNATIONAL SEARCH REPORT

International Application No
PCT/GB2004/005432

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 B63B3/38

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 B63B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the International search (name of data base and, where practical, search terms used)

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C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	GB 2 177 353 A (BASIL CAMERON * RENNIE; CHRISTOPHER JOHN * RENNIE) 21 January 1987 (1987-01-21) cited in the application	1,2,5, 8-18
Y	the whole document	3,4,6,7
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Y	US 6 467 422 B1 (ELMS ANTONY RICHARD) 22 October 2002 (2002-10-22) abstract; figures column 1, lines 5-23	3,4,6,7

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7 April 2005	19/04/2005

Name and mailing address of the ISA	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL – 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax (+31-70) 340-3016	Nicol, Y

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INTERNATIONAL SEARCH REPORT

Information on patent family members

Inter ıal Application No
PCT/GB2004/005432

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